We claim:

1. A method for separating a polyhydroxyalkanoate ("PHA") from a plant biomass comprising plant oil and meal, the method comprising extracting the plant biomass with a first solvent to essentially remove the oil from the biomass, and then separating the PHA from the plant biomass.

2. The method of claim 1 wherein the plant biomass is derived from a transgenic plant.

3. The method of claim 1 further comprising derivatizing the PHA prior to separating the PHA from the biomass.

4. The method of claim 1 wherein the separated PHA comprises one or more units having the formula:

$-OCR^1R^2(CR^3R^4)_nCO-$

wherein n is 0 or an integer; and

wherein R^1, R^2, R^3, and R^4 each are independently selected from the group consisting of hydrocarbon radicals, halo- and hydroxy-substituted radicals, hydroxy radicals, halogen radicals, nitrogen-substituted radicals, oxygen-substituted radicals and hydrogen atoms.

5. The method of claim 4 wherein the separated PHA is selected from the group consisting of monomers, dimers, linear and cyclic oligomers, and lactones of the units.

6. The method of claim 3 wherein the separated PHA is selected from the group consisting of

esters defined by the formula: $HOCR^1R^2(CR^3R^4)_nCO_2R^5$;

amides defined by the formula: $HOCR^1R^2(CR^3R^4)_nCONR^5R^6$;

thioesters defined by the formula: $HOCR^1R^2(CR^3R^4)_nCOSR^5$;

acids defined by the formula: $HOCR^1R^2(CR^3R^4)_nCO_2H$;

ethers defined by the formula: $R^6OCR^1R^2(CR^3R^4)_nCO_2R^5$;

esters defined by the formula: $R^6CO_2CR^1R^2(CR^3R^4)_nCO_2R^5$;

unsaturated compounds, defined by the formulas:

$R^1R^2C=CR^3(CR^4R^5)_nCO_2R^6$; and

$R^1R^2R^3CC(R^4)=C(R^5)CO_2R^6$;

diols defined by the formula: $HOCR^1R^2(CR^3R^4)_nCH_2OH$;

lactones or macrolides defined by the formula:

$(-OCR^1R^2(CR^3R^4)_nCO-)_X$, wherein x is an integer; and

ketones or aldehydes defined by the formulas:

$HOCR^1R^2(CR^3R^4)_nCOR^5$;

$HOCR^1R^2(CR^3R^4)_nCHO$;

$R^1CO(CR^2R^3)_nCOOR^4$; and

$R^1CO(CR^2R^3)_nCOR^4$;

wherein n is 0 or an integer; and

wherein R^1, R^2, R^3, R^4, R^5 and R^6 are each independently selected from the group consisting of hydrocarbon radicals, halo- and hydroxy-substituted radicals, hydroxy radicals, halogen radicals, nitrogen-substituted radicals, oxygen-substituted radicals, and hydrogen atoms.

7. The method of claim 1 comprising

a) providing a plant biomass containing a PHA;

b) pre-processing the plant biomass to obtain a mixture containing PHA, oil and plant meal;

c) extracting oil from the mixture with a first solvent in which the oil is soluble and in which the PHA is not highly soluble, to obtain a residual meal mixture comprising PHA; and

d) extracting the residual meal mixture obtained in step c) with a second solvent in which the PHA is soluble, to separate PHA from the biomass.

8. The method of claim 1 comprising

a) providing a plant biomass containing a PHA;

b) pre-processing the plant biomass to produce a mixture containing PHA, oil and plant meal;

c) extracting oil from the mixture with a first solvent in which the oil is soluble and in which the PHA is not highly soluble, to obtain a residual meal mixture comprising PHA;

d) treating the residual meal mixture comprising PHA, obtained in step c), with at least one chemical or biochemical agent, to chemically derivatize the PHA; and

e) separating derivatized PHA from the residual meal mixture obtained in step d).

9. The method of claim 7 or 8 wherein step b) comprises pre-processing the plant biomass using one or more processes selected from the group consisting of drying, dehulling, cleaning, ageing, cleaning, weighing, cracking, flaking, pressing, rolling, grinding, cooking, crushing, settling and filtering.

10. The method of claim 7 or 8 wherein the first solvent comprises a hydrocarbon.

11. The method of claim 10 wherein the first solvent comprises a hydrocarbon selected from the group consisting of propane, butane, pentane, hexane, heptane, octane, nonane and decane.

12. The method of claim 7 wherein the second solvent is selected from the group consisting of a chlorinated organic solvent, an alkyl carbonate, an alcohol, and a hydroxyacid and mixtures thereof.

13. The method of claim 12 wherein the second solvent comprises a chloronated organic solvent selected from the group consisting of chloroform, methylene chloride, dichloroethane, trichloroethane, tetrachloroethane and dichloroacetate.

14. The method of claim 7 wherein the second solvent comprises a composition selected from the group consisting of a propylene carbonate,

ethylene carbonate, trifluoroethanol, acetic anhydride, acetic acid, dimethylformamide, ethylacetoacetate, triolein, toluene, dioxan, tetrahydrofuran, diethylether and pyridine.

15. The method of claim 8 wherein, in step d), the residual meal mixture comprising PHA is treated with at least one chemical agent selected from the group consisting of an acid, a base, a detergent, an oxidizing agent, a chelating agent, a reducing agent, a nucleophilic reagent, an electrophilic reagent, a metal ion, an aqueous solution and an organic solution.

16. The method of claim 8 wherein the PHA is derivatized by a chemical transformation selected from the group consisting of an esterification, transesterification, hydrolysis, saponification, aminolysis, thiolysis, etherification, silylation, addition, elimination, rearrangement, and a condensation.

17. The method of claim 8 wherein the biochemical agent is an enzyme.

18. The method of claim 17 wherein the enzyme is selected from the group consisting of a depolymerase, protease, nuclease, lipase, phosphorylase and a glycosidase.

19. The method of claim 8 wherein, in step e), the derivatized PHA is separated by a physical process selected from the group consisting of distillation, extraction, centrifugation, filtration, and chromatography.

20. The method of claim 7 or 8 wherein the first and second solvents each have boiling points between 30°C and 250°C.

21. The method of claim 7 or 8 further comprising using a third solvent to precipitate the separated PHA.

22. The method of claim 1 wherein the biomass is derived from a plant source selected from the group consisting of soybean, cotton, coconuts, groundnuts, rapeseed, sunflower seed, olive, palm, sesame seed, linseed, castor, safflower seed, tobacco and potato.

23. The method of claim 4 wherein the separated PHA includes one or more of the same or different units selected from the group consisting of hydroxybutyrate, hydroxyvalerate, hydroxyhexanoate, hydroxyheptanoate, hydroxyoctanoate, hydroxynonanoate, and hydroxydecanoate.

24. The method of claim 1 wherein the separated PHA is selected from the group consisting of 3-hydroxybutyric acid, crotonic acid and alkyl esters thereof.

25. The method of claim 2 wherein the plant biomass is derived from a plant containing a heterologous PHA synthase gene derived from a microorganism selected from the group consisting of *Acinetobacter, Aeromonas, Alcaligenes, Azotobacter, Bacillus, Brevibacterium, Corynebacterium, Chromatium, Flavobacterium, Halobacterium, Pseudomonads, Nocardia, Rhodococcus, Thiocystis, Streptomyces, Streptococcus* and *Zoogloea*.

26. A method for separating a polyhydroxyalkanoate ("PHA") from a plant biomass comprising plant oil, the method comprising extracting a plant biomass with a first solvent, in which the oil and PHA are soluble, to essentially remove oil and PHA from the biomass, and then separating PHA from the oil.

27. The method of claim 26 wherein the plant biomass is derived from a transgenic oil crop plant.

28. The method of claim 26 wherein the method comprises

a) providing a plant biomass containing a PHA;

b) pre-processing the plant biomass to obtain a mixture of PHA, oil and plant meal;

c) extracting oil and PHA from the mixture with a first solvent in which the oil and the PHA are soluble and in which the meal is not highly soluble; and

d) separating the PHA from the oil.

29. The method of claim 28 wherein the PHA is separated from the oil in step d) by treating the PHA-oil mixture with a chemical or biochemical agent, thereby to chemically derivatize the PHA, and separating derivatized PHA from the oil.

30. The method of claim 28 wherein the solvent is selected from the group consisting of a chloronated organic solvent, an alkylcarbonate, an alcohol, a hydroxyacid and a hydrocarbon, and mixtures thereof.

31. The method of claim 28 wherein the solvent is selected from the group consisting of hexane, trifluoroethanol, acetic anhydride, dimethylformamide, ethylacetoacetate, triolein, acetic acid, toluene, dioxane, tetrahydrofuran, diethylether and pyridine.

32. The method of claim 29 wherein the biochemical agent is an enzyme selected from the group consisting of a PHA depolymerase, protease, lipase, esterase, hydratase and a phosphorylase.

33. The method of claim 7, 8, 28 or 29 wherein the separated PHA includes a functional group selected from the group consisting of esters, amides, thioesters, acids, ethers, esters, unsaturated compounds, diols, ketones and aldehydes.

34. The method of claim 7, 8, 28 or 29 wherein the separated PHA includes one or more units selected from the group consisting of a 3-hydroxyacid, a 4-hydroxyacid and a 5-hydroxyacid.

35. The method of claim 7 or 28 wherein the separated PHA is separated in an organic solvent; and wherein the method further comprises:

emulsifying the PHA in the organic solvent in an aqueous solution containing a surfactant, thereby to form a PHA latex.